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PATENT
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1-17-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gerbrand Deetman

Filed: March 8, 2001

Application No.: 09/801,883

For: Stabilized Phosphate Ester-Based
Functional Fluid Compositions

§ Group Art Unit: 1725

§ Examiner:

§ Attorney Docket No.: 12598.0115.CNUS01

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to
the Patent Office at 703-672-9882 on the date below:*1-16-02*
Date*Craig M. Lundell*
SignatureLETTERAssistant Commissioner for Patents
Washington, D.C. 20231

Sir:

To the extent that they have not already been entered, please enter Claims 90-104, a copy of which is attached hereto, in the above identified application. These claims were filed with and formed a part of the original reissue application.

Respectfully submitted,

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90. A fluid composition suitable for use as an aircraft hydraulic fluid, comprising:

(a) a fire resistant phosphate ester base stock;

(b) a viscosity index improver in a proportion of between about 3% and about 10% by weight of the fluid composition, the viscosity index improver comprising a methacrylate ester polymer, the repeating units of which substantially comprise butyl and hexyl methacrylate, at least 95% by weight of the polymer having a molecular weight of between about 50,000 and about 1,500,000;

(c) an anti-erosion agent in a proportion of between about 0.02% and about 0.08% by weight of the fluid composition, the anti-erosion agent comprising an alkali metal salt of a perfluoroalkyl sulfonic acid, the alkyl substituent of which is selected from the group consisting of hexyl, heptyl, octyl, nonyl, decyl, and mixtures thereof;

(d) an acid scavenger in a proportion of between about 1.5% and about 10% by weight of the fluid composition, the acid scavenger comprising an epoxide compound;

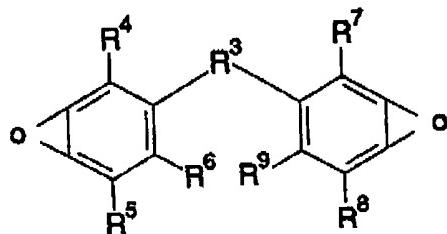
(e) a 2,4,6-trialkylphenol in a proportion of between about 0.1% and about 1.0% by weight of the fluid composition;

(f) a di(alkylphenyl)amine in a proportion of between about 0.3% and about 1.0% by weight of the fluid composition; and

(g) a hindered polyphenol selected from the group consisting of bis(3,5-dialkyl-4-hydroxyaryl)methane, 1,3,5-trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxyaryl)benzene

and mixtures thereof in a proportion of between about 0.3%
and about 1.0% by weight of the fluid composition.

91. A fluid composition as set forth in Claim 90
wherein the acid scavenger is selected from the group
consisting of a derivative of a 3,4-epoxy cyclohexane
carboxylate and a diepoxide compound corresponding to the
formula

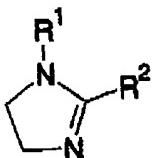


wherein R¹ is an organic group containing 1 to 10 carbon atoms, from 0 to 6 oxygen atoms and from 0 to 6 nitrogen atoms, and R⁴ through R⁹ are independently selected from among hydrogen and aliphatic groups containing 1 to 5 carbon atoms, and mixtures of the 3,4-epoxycyclohexane carboxylate and the diepoxide compound.

92. A fluid composition as set forth in Claim 90
further comprising benzotriazole or a benzotriazole
derivative in a proportion of between about 0.005% and about
0.09% as a copper corrosion inhibitor.

93. A fluid composition as set forth in claim 90
further comprising between about 0.0035% and about 0.10% by weight of an alkali metal arenate.

94. A fluid composition as set forth in claim 90
further comprising a 4,5-dihydroimidazole compound corresponding to the formula



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where R¹ is selected from the group consisting of hydrogen, alkyl, alkenyl, hydroxyalkyl, hydroxyalkenyl, alkoxyalkyl and alkoxyalkenyl, and R² is selected from the group consisting of alkyl, alkenyl and aliphatic carboxylate.

95. A fluid composition as set forth in claim 94
wherein the 4,5-dihydroimidazole is selected from the group consisting of 2-(8-heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol and the condensation product of a C₁₄ to C₁₈ fatty acid and 4,5-dihydro-1H-imidazole.

96. A fluid composition as set forth in claim 95
wherein the 4,5-dihydroimidazole compound is the condensation

product of a C₁₆ to C₁₈ fatty acid and 4,5-dihydro-1H-imidazole.

97. A fluid composition as set forth in claim 90 further comprising an anti-foam agent.

98. A fluid composition as set forth in claim 97 wherein the anti-foam agent is a polyalkylsiloxane.

99. A fluid composition as set forth in claim 98 wherein the polyalkylsiloxane is polymethylsiloxane.

100. A fluid composition as set forth in claim 97 wherein the anti-foam agent is present in a concentration of from about 0.0001% to about 0.001% by weight of the fluid composition.

101. A fluid composition as set forth in claim 90 wherein the base stock comprises between about 80% and about 99% by weight of a trialkyl phosphate and between about 1.0% and about 20% by weight of a triaryl phosphate wherein the aryl substituents are chosen from the group consisting of phenyl and alkyl-substituted phenyl.

102. A fluid composition as set forth in claim 101 wherein the triaryl phosphate is chosen from the group consisting of triphenyl phosphate, tri(alkyl-substituted

phenyl) phosphate, phenyl di(alkyl-substituted phenyl) phosphate, diphenyl alkyl-substituted phenyl phosphate, and mixtures thereof.

103. A fluid composition as set forth in claim 102 wherein the alkyl-substituted phenyl group in the tri(alkyl-substituted phenyl) phosphate, phenyl di(alkyl-substituted phenyl) phosphate, and diphenyl alkyl-substituted phenyl phosphate, is tert-butylphenyl or isopropyl phenyl.

104. A fluid composition suitable for use as an aircraft hydraulic fluid, comprising:

(a) a fire resistant phosphate ester base stock comprising a phosphate ester selected from the group consisting of triaryl phosphates, trialkyl phosphates, dialkylaryl phosphates, diarylalkyl phosphates and mixtures thereof;

(b) a viscosity index improver in a proportion of between about 3% and about 10% by weight of the fluid composition, the viscosity index improver comprising a methacrylate ester polymer, the repeating units of which substantially comprise butyl and hexyl methacrylate, at least 95% by weight of the polymer having a molecular weight of between about 50,000 and about 1,500,000;

(c) an anti-erosion agent in a proportion of between about 0.02% and about 0.08% by weight of the fluid composition, the anti-erosion agent comprising an alkali

metal salt of a perfluoroalkyl sulfonic acid, the alkyl substituent of which is selected from the group consisting of hexyl, heptyl, octyl, nonyl, decyl, and mixtures thereof;

(d) an acid scavenger in a proportion of between about 1.5% and about 10% by weight of the fluid composition, the acid scavenger comprising an epoxide compound;

(e) a 2,4,6-trialkylphenol in a proportion of between about 0.1% and about 1.0% by weight of the fluid composition;

(f) a di(alkylphenyl)amine in a proportion of between about 0.3% and about 1.0% by weight of the fluid composition; and

(g) a hindered polyphenol selected from the group consisting of bis(3,5-dialkyl-4-hydroxyaryl)methane, 1,3,5-trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxyaryl)benzene and mixtures thereof in a proportion of between about 0.3% and about 1.0% by weight of the fluid composition.

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